

CLAIMS:

What is claimed is:

1. A method of making olefin derivatives from an oxygenate comprising:
 - contacting the oxygenate with a molecular sieve catalyst to produce a hydrocarbon product containing olefin;
 - separating a C_4^+ fraction containing four or more carbons from the hydrocarbon product;
 - contacting the C_4^+ fraction with an oligomerization catalyst to produce a product containing higher olefin and a vent stream; and .
 - contacting a portion of the vent stream with the oligomerization catalyst.
2. The method of claim 1 wherein the C_4^+ fraction comprises from about 80% to about 97% by weight butenes and from about 3% to about 20% by weight butanes.
3. The method of claim 2 wherein the butenes comprise from about 20% to about 40% by weight 1-butene, and from about 60% to about 80% by weight 2-butene.
4. The method of claim 1 wherein the olefin product comprises less than 20 ppmw by weight of an individual contaminant, the individual contaminants selected from the group consisting of hydrogen sulfide, carbonyl sulfide, and arsine.
5. The method of claim 1 wherein the molecular sieve catalyst is selected from the group consisting of SAPO-17, SAPO-18, SAPO-34, SAPO-35, SAPO-44, SAPO-56, ZSM-5, ZSM-22, ZSM-35, the metal containing forms of each thereof, and mixtures thereof.

6. The method of claim 1 wherein the oligomerization catalyst is selected from the group consisting of nickel-alkyl aluminum, solid phosphoric acid, nickel-oxide, and ZSM-57.

7. The method of claim 1 further comprising contacting a portion of the product containing higher olefin with a hydroformylation catalyst.

8. The method of claim 1 further comprising separating octenes from the product containing higher olefin and contacting a portion of the octenes with a hydroformylation catalyst to form nonanyl alcohols.

9. The method of claim 1 further comprising separating nonenes from the product containing higher olefin and contacting a portion of the nonenes with a hydroformylation catalyst to form decyl alcohols.

10. The method of claim 1 further comprising separating dodecenes from the product containing higher olefin and contacting a portion of the dodecenes with a hydrogenation catalyst to form dodecanes.

11. An olefin composition comprising:
60 to 80 percent by weight octene;
2 to 10 percent by weight nonene; and
8 to 25 percent by weight dodecene.

12. The olefin composition of claim 11 further comprising 2 to 10 percent by weight olefin having sixteen to twenty carbon atoms.

13. The olefin composition of claim 11 wherein the olefin composition comprises a branching number less than 2.0.

14. The olefin composition of claim 11 wherein the octene comprises an average branching number less than 1.4.

15. The olefin composition of claim 11 wherein the nonene comprises an average branching number less than 1.5.

16. The olefin composition of claim 11 wherein the dodecane comprises an average branching number less than 1.8.

17. The olefin composition of claim 11 wherein the olefin composition comprises from about 10% to about 50% by weight alpha-olefin.

18. The olefin composition of claim 11 wherein the octene comprises from about 60 % to about 95% by weight 1-octene.

19. The olefin composition of claim 18 wherein the octene comprises from about 5% to about 30% 2-octene.